

PRELIMINARY DATA SUMMARY

December 1985

U.S. Army Engineer Waterways Experiment Station
Coastal Engineering Research Center
Field Research Facility
Duck, North Carolina

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CERC Field Research Facility
Duck, North Carolina

This report provides a summary of basic oceanographic, meteorological and bottom profile data for the month. The data were obtained as part of the Field Research Facility Measurement and Analysis Work Unit at the U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center's Field Research Facility in Duck, North Carolina. The data were collected and the analyses performed by the FRF staff. These summaries are intended to make the data readily available to all FRF users, and comments on their content and usefulness are invited.

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I. INTRODUCTION

The U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center's (CERC) Field Research Facility (FRF) is located on the Outer Banks of North Carolina, near the village of Duck (Fig.1).

The FRF research program provides a means for obtaining high-quality field data, particularly during storms, in support of the U.S. Army Corps of Engineers' coastal engineering research missions. The FRF consists of a 561-m (1,840 ft) long concrete research pier supported on 0.91 m (3 ft) diameter steel piles. The pier deck is 6.1 m (20 ft) wide, 7.74 m (25.4 ft) above mean sea level (MSL), and extends from behind the dunes to approximately the 7.6 m (25 ft) depth contour. In addition, a main building contains offices, an instrument repair shop, and a data acquisition room.

One of the responsibilities of the FRF research program is the collection, analysis and dissemination of data on local oceanographic and meteorological conditions. Bottom profiles along both sides of the pier and periodic bathymetric surveys are also performed.

This summary is intended to provide basic data as soon as possible after they are obtained. Most of the data are daily observations or the results of preliminary data analysis. In many instances, continuous analog records and more extensive analyses will be made available later by the CERC Coastal Engineering Information and Analysis Center (CEIAC).

Table 1 is a list of instruments used, their status during the month, and the data collection status. Figure 2 identifies the location of the instruments. The water depth at the wave gages and current meters vary and may best be determined from the information contained in Figure 8. Other installation information is contained in Table 1. All times unless otherwise specified are referenced to Eastern Standard Time (EST).

Section II presents the meteorological data; Sections III through VI, oceanographic data; Section VII, nearshore profiles and bathymetry; and Section VIII, if included, documents special events that occurred at the FRF during the month.

Questions and/or comments concerning the data may be directed to Mr. Herman C. Miller at (919) 261-3511.

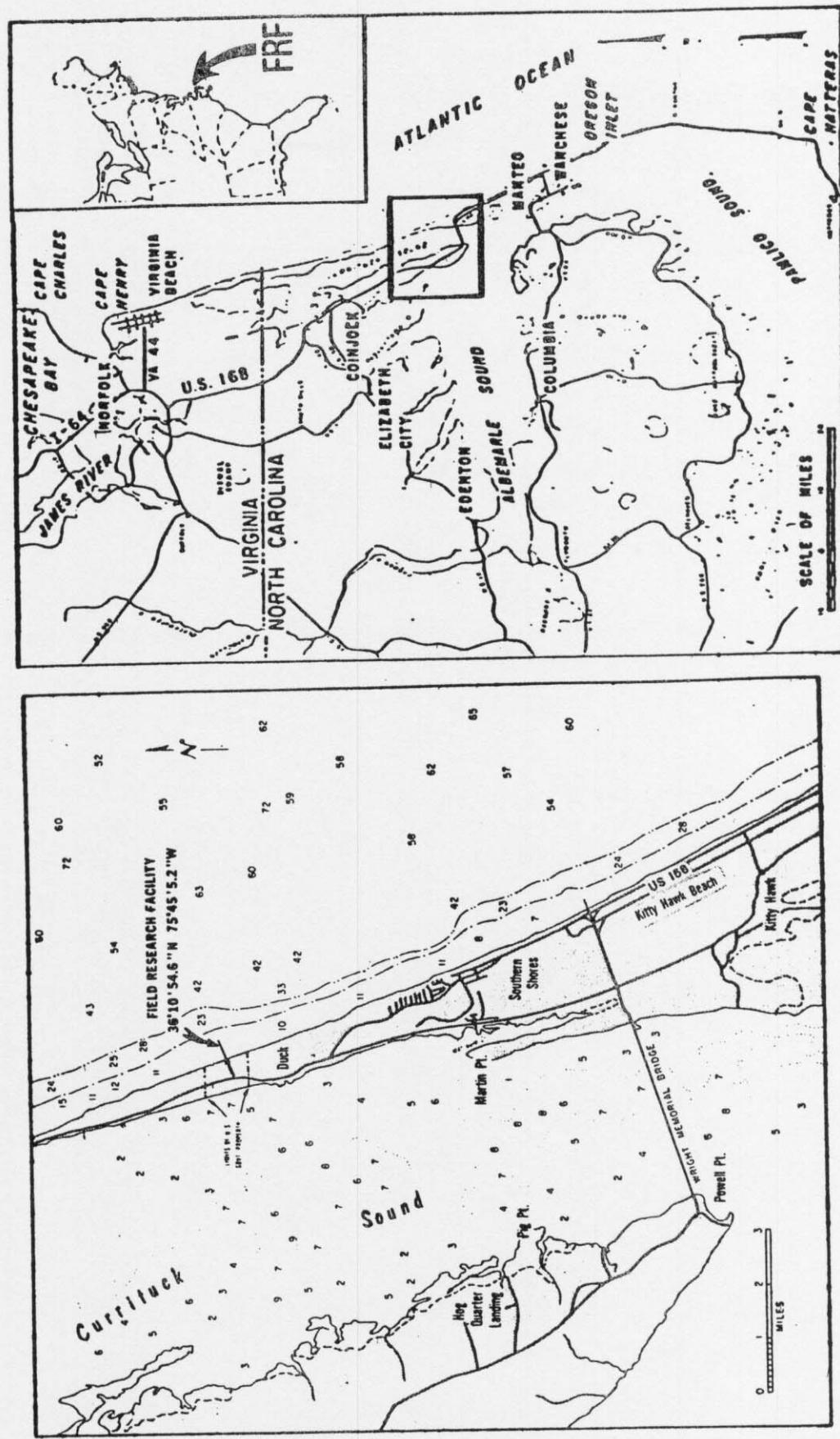


Figure 1. FRF Location Map

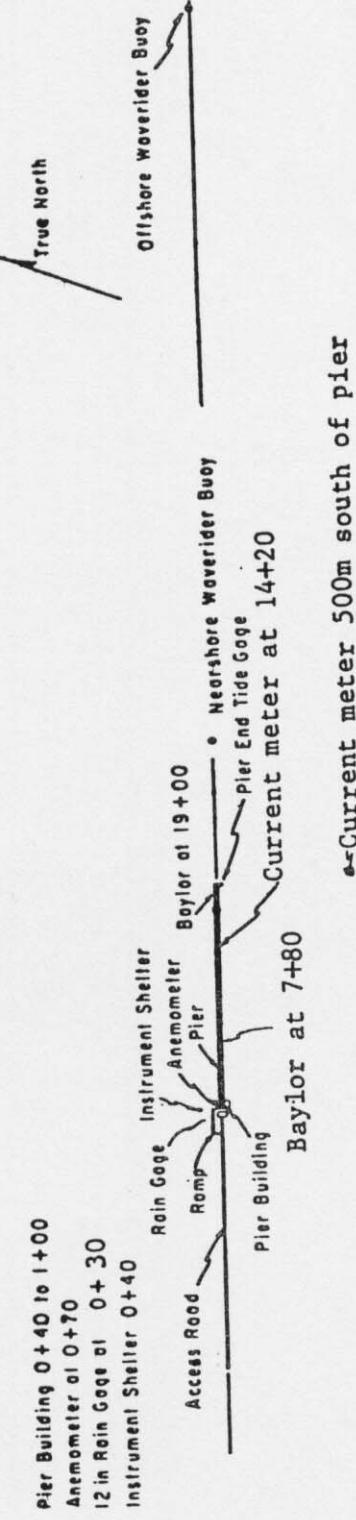
TABLE 1
INSTRUMENT STATUS/DATA AVAILABILITY

December 1985

GAGE NUMBER	DESCRIPTION/REMARKS	DEPTH AT SENSOR	DAY OF THE MONTH													
			1/2/3/4/5/6/7/8/9/10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31			Instrument Status			Data Collected			Analogue Record			Instrument Status	
			Data Collected	Analogue Record	Instrument Status	Data Collected	Analogue Record	Instrument Status	Data Collected	Analogue Record	Instrument Status	Data Collected	Analogue Record	Instrument Status	Data Collected	Analogue Record
	Barometric Pressure															
	Precipitation															
	Air Temperature															
	Anemometer on Lab Bldg - Elevation 19a (MSL)															
645	Baylor staff located at station 7+80 on FRF pier	See profile														
625	Baylor staff located at station 19+00 on FRF pier	See profile														
640	Waverider buoy located 1.0 km from shore	Approx. 6.5 m														
630	Waverider buoy located 6.0km from shore	Approx. 18 m														
639	Current meter at station 14+20 on FRF pier	See profile														
679	Current meter 500M south (0.3km offshore)	Approx. 6 m														
865-1370	NOAA primary tide station located at seaward end of FRF pier	Instrument Status	Data Collected													

Instrument Status: Operational - Daily Observation: YES
 Data Collected: ALL , SOME

Analog Record: ALL , PARTIAL
 Preliminary Analysis: ALL , SOME



CURRI TUCK SOUND

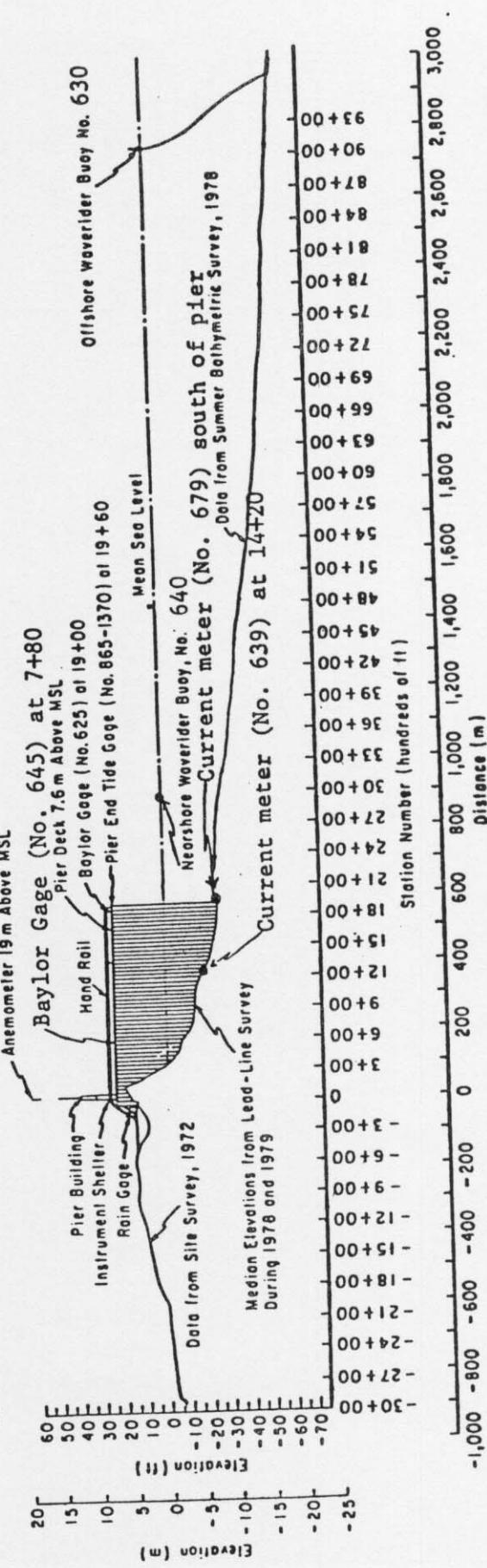


Figure 2. Instrument locations at FRF.

II. METEOROLOGICAL DATA

A variety of instruments have been installed at the FRF (Fig. 2) to monitor the meteorological conditions. The data presented in Table 2 are collected and stored on magnetic tape using a Data General NOVA-4 computer. For each instrument identified in Table 1 as having analog outputs, chart records are obtained, a log is maintained and the records are stored for future reference.

The wind measurements are obtained from a Weather Measure Skyvane located on the FRF laboratory building (Fig. 2), 19.1 m above mean sea level (MSL).

The high and low temperatures are obtained from daily readings of NWS maximum and minimum thermometers and represent the extreme temperature values since the last reading.

The following may be useful for converting the data in Table 2 to other frequently used units of measurement:

1. Millimeters (mm) to inches (in) -
 $mm \times .03937 = in$
2. Millibars (mb) to inches of mercury (in Hg) -
 $mb \times 0.02953 = in Hg$
3. Degrees Celcius (C) to degrees Fahrenheit (F) -
 $(C \times 9/5) + 32 = F$
4. Meters per second (m/s) to knots (kn) -
 $m/s \times 1.943 = kn$

TABLE 2: METEOROLOGICAL DATA

PART 1

DECEMBER 1985

DAY	HOUR	WIND SPEED (M/S)	WIND DIRECTION (DEG TN)	TEMPERATURE (DEG C)	ATM PRESSURE (MB)	PRECIPITATION (MM)
1	100	5	305	13.7	1014.9	0
	700	6	323	14.2	1015.0	0
	1300	5	308	14.6	1013.7	0
	1900	5	259	13.1	1012.6	0
2	100	6	207	14.1	1008.3	0
	700	10	234	16.1	1005.8	0
	1300	12	252	17.8	1002.7	0
	1900	11	284	9.0	1010.5	0
3	100	9	295	2.1	1017.0	0
	700	10	297	-6	1022.1	0
	1300	7	329	3.6	1024.2	0
	1900	5	324	2.8	1027.7	0
4	100	6	31	5.4	1028.3	0
	700	2	345	4.4	1028.7	0
	1300	Computer maintenance			1028.0	0
	1900	2	354	5.7	1028.0	0
5	100	5	334	5.2	1026.4	0
	700	6	47	8.5	1026.0	0
	1300	4	51	11.1	1022.6	0
	1900	2	293	10.2	1018.3	0
6	100	3	317	7.8	1014.4	0
	700	4	321	6.4	1012.9	0
	1300	9	332	7.9	1012.9	0
	1900	10	334	7.2	1017.1	0
7	100	14	357	7.5	1019.5	0
	700	12	14	6.7	1023.8	0
	1300	6	330	6.9	1025.5	0
	1900	1	332	4.0	1025.3	0
8	100	3	222	5.1	1024.5	0
	700	5	229	6.1	1023.3	0
	1300	6	236	10.8	1020.1	0
	1900	4	235	9.3	1020.2	0
9	100	2	227	7.9	1021.5	0
	700	4	268	7.2	1023.1	0
	1300	2	258	13.0	1023.4	0
	1900	3	73	11.8	1025.5	0
10	100	3	209	7.8	1026.7	0
	700	1	179	6.6	1028.4	0
	1300	2	134	15.2	1028.0	0
	1900	5	197	11.9	1027.6	0
11	100	4	229	10.6	1026.4	0
	700	4	217	10.6	1025.1	0
	1300	5	227	16.9	1021.0	0
	1900	7	236	15.9	1019.8	0
12	100	7	223	15.8	1016.3	0
	700	7	237	16.4	1014.8	0
	1300	5	259	16.2	1013.5	0
	1900	2	260	14.4	1014.6	0
13	100	7	19	13.8	1014.1	0
	700	3	217	14.3	1010.1	0
	1300	6	247	17.1	1006.9	4
	1900	3	114	13.4	1005.0	0
14	100	6	334	10.5	1004.7	0
	700	10	336	6.5	1007.9	0
	1300	9	321	5.7	1012.6	0
	1900	8	331	3.7	1020.7	0
15	100	6	311	-4	1024.7	0
	700	3	300	-1.4	1026.1	0
	1300	6	229	5.3	1024.1	0
	1900	7	232	6.0	1023.2	0
16	100	8	251	5.8	1022.5	0
	700	6	284	3.6	1022.6	0
	1300	3	240	8.5	1021.0	0
	1900	4	204	7.3	1019.0	0

TABLE 2: METEOROLOGICAL DATA

PART 2

DECEMBER 1985

DAY	HOUR	WIND	WIND	TEMPERATURE	ATM	PRECIPITATION
		SPEED (M/S)	DIRECTION (DEG TN)	(DEG C)	PRESSURE (MB)	(MM)
17	100	10	251	7.3	1018.5	0
	700	6	271	5.8	1020.6	0
	1300	6	250	10.1	1019.6	0
	1900	3	193	7.6	1018.9	0
	100	6	230	7.8	1017.2	0
18	700	7	257	7.0	1017.7	0
	1300	6	306	10.0	1019.7	0
	1900	8	10	3.5	1024.8	0
	100	10	13	2.2	1027.0	0
19	700	11	7	.4	1029.7	0
	1300	11	8	1.1	1029.7	0
	1900				1029.7	0
	100		System crash		1027.7	0
20	700	9	41	8.6	1023.2	0
	1300	7	343	6.2	1020.2	0
	1900	6	315	2.4	1019.5	0
	100	6	297	-.8	1020.5	0
	700	7	318	-1.6	1020.9	0
21	1300	6	330	1.6	1021.2	0
	1900				1021.9	0
	100		System crash		1023.2	0
	700	2	293	-1.2	1024.3	0
	1300	5	224	1.3	1021.6	0
22	1900	5	200	2.1	1017.8	0
	100	7	225	4.2	1014.0	0
	700	6	210	4.6	1011.7	0
	1300	4	228	10.4	1010.0	0
	1900	4	193	8.5	1009.3	0
23	100	6	218	8.8	1009.0	0
	700	4	197	8.4	1009.0	0
	1300	6	229	14.3	1007.3	0
	1900				1003.6	0
	100		Disk drive crash		1006.0	0
25	700				1008.0	0
	1300				1013.4	0
	1900				1017.8	C
	100				1024.9	0
26	700	7	286	-5.5	1024.9	0
	1300	7	270	-4.4	1023.2	0
	1900	6	219	-2.7	1022.2	0
	100	8	240	-.2	1022.2	0
27	700	7	235	-.2	1021.3	0
	1300	4	219	5.5	1019.1	0
	1900	4	206	4.6	1020.0	0
	100	5	225	3.9	1019.4	0
28	700	4	244	3.1	1020.0	0
	1300	4	232	8.7	1020.3	0
	1900	3	203	7.3	1020.8	0
	100	2	228	5.2	1017.3	0
29	700	1	281	5.0	1015.4	0
	1300	4	239	9.0	1011.1	0
	1900	4	277	5.0	1012.1	0
	100	5	295	3.4	1015.2	0
30	700	4	302	-.8	1019.8	0
	1300	1	357	6.5	1021.2	0
	1900	2	215	-.9	1023.2	0
	100	1	203	1.6	1023.2	0
31	700	3	201	2.1	1022.4	0
	1300	7	219	10.2	1017.6	0
	1900	6	207	9.1	1016.6	C

III. WAVE DATA

Wave data were collected from two Baylor staff gages (CERC gage Nos. 625 and 645) and Waverider buoys (CERC gage Nos. 630 and 640, Table 1 and Figure 2). The data were collected, analyzed, and stored on magnetic tape using a Data General NOVA-4 computer.

The NOVA-4 is programmed to sample the wave gages every 6 hours near 0100, 0700, 1300, and 1900 EST at a sampling rate of four times per second, collecting data in 20-minute records.

Wave height (H_{mo}) is an energy-based statistic equal to four times the standard deviation of the sea surface elevations. The wave period is identified from the computation of a variance (energy) spectrum using a Fast Fourier Transform of 4096 data points (1024 sec). The period (T_p) is that associated with the maximum energy density in the spectrum. When this analysis is complete, the data are written to magnetic tape and entered into the CERC data base.

Table 3 presents the wave heights and periods for each wave record obtained during the month. The monthly means shown in Table 3 are an average of the values computed for all data records collected. The monthly standard deviations are standard deviations from the monthly mean of values for each record.

Figure 3 is a time history of the H_{mo} and T_p values for the Waverider 6 km from shore (630) and the Baylor gage at pier station 19+00 (625).

Differences in wave periods between wave gages (Table 4 and Figure 3) may be due to wave breaking or reformation, or the presence of multiple wave trains containing nearly equal energy.

TABLE 3: WAVE DATA

PART 1

DECEMBER 1985

GAGE	DAY	TIME	645		625		640		630	
			Baylor	at 7+80 Hmo(m)	Baylor	at 19+00 Hmo(m)	Nearshtr	Wvrdr T(sec)	Farshtr	Wvrdr Hmo(m)
	1	1	.73	6.40	1.18	10.89	1.28	10.89	1.34	9.75
	7		1.13	5.99	1.48	9.75	1.48	9.75	1.96	10.89
	13		1.30	12.34	1.76	12.34	1.76	12.34	1.99	10.89
	19		1.66	14.22	2.00	14.22	2.11	14.22	2.12	14.22
2	1		.79	14.22	1.26	12.34	1.36	12.34	1.30	10.89
	7		.58	12.34	.97	12.34	1.00	12.34	1.03	10.89
	13		.33	10.89	.54	10.89	.67	10.89	.84	10.89
	19		.70	5.02	.89	4.76	.97	5.02	1.10	4.53
3	1		.84	5.31	.88	5.02	1.00	5.02	1.13	5.63
	7		.94	6.40	1.08	5.99	1.22	7.42	1.47	8.06
	13		1.14	5.63	1.15	5.63	1.16	6.40	1.44	6.40
	19		.98	5.31	1.19	5.99	1.15	6.87	1.31	5.99
4	1		.87	5.63	1.04	16.79	1.10	5.99	1.13	5.63
	7		.77	4.76	.95	16.79	.93	16.79	1.08	5.63
	13				Computer maintenance					
	19		.52	16.79	.74	14.22	.68	16.79	.92	6.40
5	1		.48	16.79	.67	14.22	.68	16.79	.85	16.79
	7		.56	16.79	.81	16.79	.79	16.79	.82	3.79
	13		.47	14.22	.65	14.22	.67	16.79	.70	3.95
	19		.45	16.79	.72	16.79	.68	16.79	.68	6.40
6	1		.38	16.79	.55	16.79	.56	16.79	.56	6.40
	7		.45	14.22	.59	16.79	.56	16.79	.63	14.22
	13		.98	5.02	1.03	5.02	1.11	5.31	1.58	5.99
	19		1.35	6.40	1.40	6.87	1.39	6.40	1.30	6.40
7	1		2.13	7.42	2.28	7.42	2.25	6.87	2.19	6.87
	7		1.75	12.34	2.27	12.34	2.62	12.34	2.68	12.34
	13		1.68	12.34	1.99	12.34	2.02	12.34	2.00	12.34
	19		1.18	5.63	1.58	12.34	1.51	12.34	1.48	12.34
8	1		1.37	12.34	1.56	12.34	1.68	12.34	1.69	12.34
	7		.85	14.22	1.10	12.34	1.24	12.34	1.15	12.34
	13		.42	12.34	.89	10.89	.91	10.89	.86	10.89
	19		.29	12.34	.76	10.89	.80	10.89	.74	10.89
9	1		.19	10.89	.52	10.89	.58	10.89	.54	10.89
	7		.24	10.89	.37	10.89	.48	9.75	.46	9.75
	13		.20	9.75	.38	9.75	.41	9.75	.41	9.75
	19		.18	10.89	.30	10.89	.32	10.89	.31	10.89
10	1		.23	3.51	.38	8.83	.38	9.75	*	
	7		.20	9.75	.32	9.75	.39	10.89	.36	10.89
	13		.21	9.75	.38	5.63	.35	5.63	.36	5.63
	19		.21	9.75	.35	9.75	.36	14.22	*	
11	1		.16	10.89	.34	12.34	.32	12.34	.41	12.34
	7		.18	9.75	.25	9.75	.27	8.83	.27	8.83
	13		.14	14.22	.29	9.75	.26	12.34	.25	12.34
	19		.23	8.83	.29	14.22	.30	8.83	.31	8.83
12	1		.25	2.42	.35	9.75	.32	9.75	.43	5.63
	7		.38	5.99	.43	5.99	.45	5.63	.44	7.42
	13		.30	4.32	.42	6.87	.45	7.42	.40	9.75
	19		.34	7.42	.33	7.42	.43	7.42		
13	1		1.09	4.76	.81	5.31	1.07	5.02	*	
	7		.92	6.40	.80	6.87	1.08	6.40	.74	6.87
	13		.45	6.40	.67	6.40	.75	6.87	.76	7.42
	19		.58	5.63	.72	7.42	.76	7.42	.84	3.05
14	1		.59	3.51	.80	8.06	.80	8.06		
	7		1.65	5.99	1.70	5.63	1.64	5.99	1.60	5.99
	13		1.59	6.87	1.46	6.87	1.55	6.87	1.55	6.87
	19		1.38	5.63	1.32	6.87	1.29	5.99	1.33	5.99
15	1		.84	5.99	.90	7.42	.89	5.99	.94	5.99
	7		.68	4.76	.81	6.87	.82	6.87	.85	6.87
	13		.31	5.31	.50	7.42	.49	6.87	.51	6.87
	19		.22	14.22	.39	14.22	.33	8.83	.34	8.83
16	1		.14	14.22	.28	14.22	.25	9.75	.28	9.75
	7		.13	14.22	.32	14.22	.29	9.75	.30	9.75
	13		.24	3.38	.29	9.75	.33	14.22	.34	14.22
	19		.31	3.64	.38	12.34	.36	8.06	.42	8.06

*=Electronic problems

TABLE 3: WAVE DATA

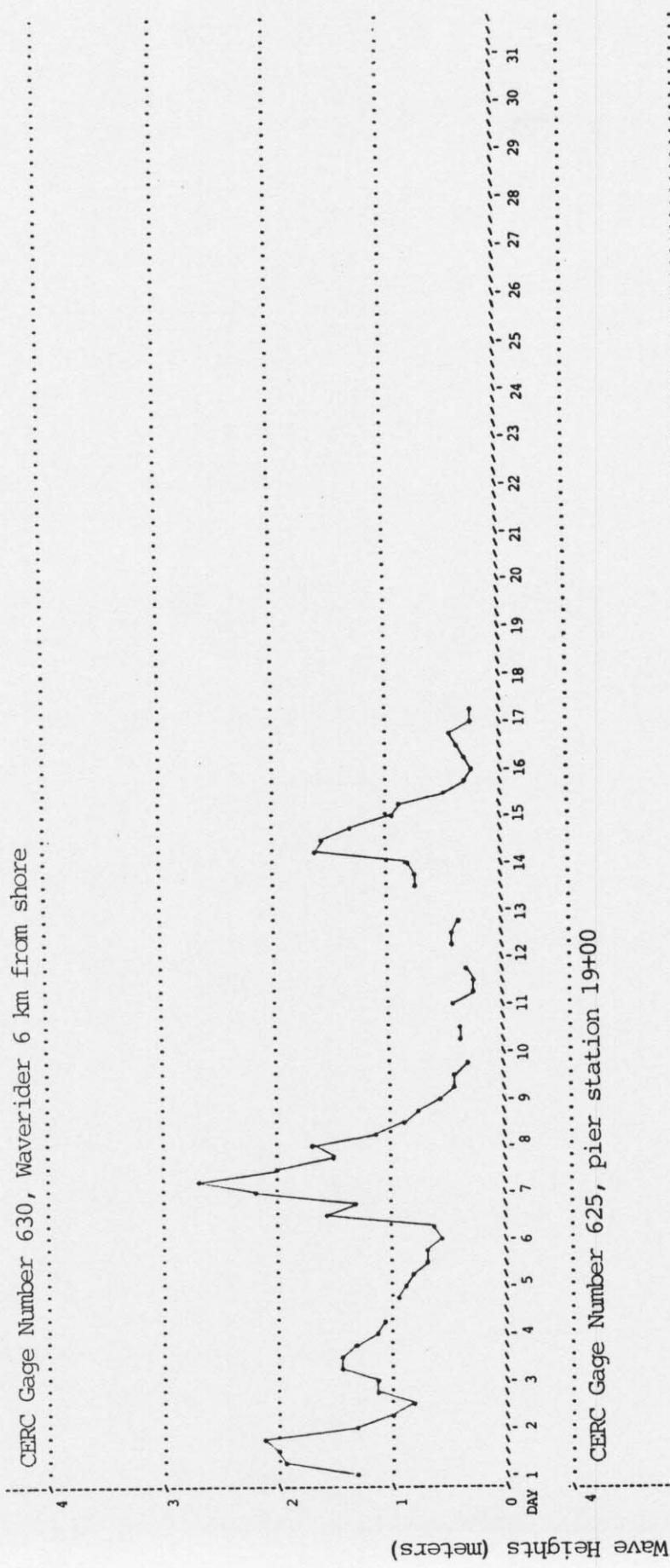
DECEMBER 1985

GAGE		645		625		640		630	
DAY	TIME	Baylor	at 7+80	Baylor	at 19+00	Nearshtr	Wvrdr	Farshtr	Wvrdr
		Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)
17	1	.14	14.22			.20	9.75	.23	9.75
	7	.11	12.34	.19	12.34	.17	12.34	.22	12.34
	13	.22	3.95	.26	6.87	.32	3.51		
	19	.23	12.34	.29	12.34	.24	12.34		
18	1	.22	12.34	.26	12.34	.26	12.34		
	7	.11	12.34	.19	9.75	.18	12.34		
	13	.39	3.79	.45	3.64	.55	3.95		
	19	1.34	5.99	.84	5.99	1.16	5.63		
19	1	1.42	5.99	.97	5.31	1.35	5.63		
	7	1.58	6.40	1.29	6.40	1.56	6.40		
	13	1.42	5.99	1.29	5.99	1.34	5.63		
	19	System Crash							
20	1			1.21	5.02	1.23	5.31		
	7	1.10	5.31	1.03	5.31	.99	6.40		
	13	.81	5.31	.84	5.31	.80	5.99		
	19	.83	5.63	.76	5.99	.77	5.63		
21	1	.75	5.31	.74	5.63	.74	5.99		
	7	.63	5.02	.89	5.99	.83	5.31		
	13	.97	5.63						
	19	System Crash							
22	1			.82	10.89	.79	5.99		
	7	.57	5.02	.71	10.89	.71	9.75		
	13	.40	5.63	.65	9.75	.62	10.89		
	19	.27	9.75	.56	12.34	.53	10.89		
23	1	.30	4.32	.53	12.34	.52	12.34		
	7	.25	12.34	.49	12.34	.44	12.34		
	13	.27	10.89	.45	8.06	.44	12.34		
	19	.31	4.53	*		.46	7.42		
24	1	.36	16.79	.42	16.79	.45	16.79		
	7	.35	16.79	.52	16.79	.49	16.79		
	13	.33	16.79						
	19								
25	1								
	7	Disk Drive Crash							
	13								
	19								
26	1								
	7	.75	5.99	.88	5.31	.85	5.63		
	13	.67	5.31	.77	5.63	.78	6.40		
	19	.40	9.75	.52	14.22	.54	6.40		
27	1	.21	14.22	.39	14.22	.39	14.22		
	7	.13	14.22	.26	14.22	.27	14.22		
	13	.18	7.42	.34	14.22	.30	14.22		
	19	.29	7.42	.37	7.42	.34	8.06		
28	1	*		.34	12.34	.32	10.89		
	7	.21	14.22	.26	10.89	.29	10.89		
	13	.18	14.22	.33	10.89	.30	16.79		
	19	.25	10.89	.40	9.75	.40	10.89		
29	1	.29	10.89	.46	10.89	.43	9.75		
	7	.29	12.34	.43	14.22	.50	10.89		
	13	.32	10.89	.49	10.89	.54	14.22		
	19	.35	9.75	.52	9.75	.56	10.89		
30	1	.35	16.79	.55	8.83	.53	10.89		
	7	.83	4.53	.85	5.02	.88	4.32		
	13	.94	5.02	.70	6.40	.91	5.99		
	19	.47	4.76	.45	14.22	.64	14.22		
31	1	.23	10.89	.36	10.89	.47	9.75		
	7	.22	10.89	.32	9.75	.44	9.75		
	13	.25	9.75	.45	9.75	.45	9.75		
	19	.40	9.75	.48	9.75	.43	8.83		
MEAN		.60	9.18	.73	10.02	.76	9.83	.54	9.07
STD		.46	4.10	.46	3.49	.48	3.60	.58	3.33

Gage Inoperative

*=Electronic problems

CERC Gage Number 630, Waverider 6 km from shore



CERC Gage Number 625, pier station 19+00

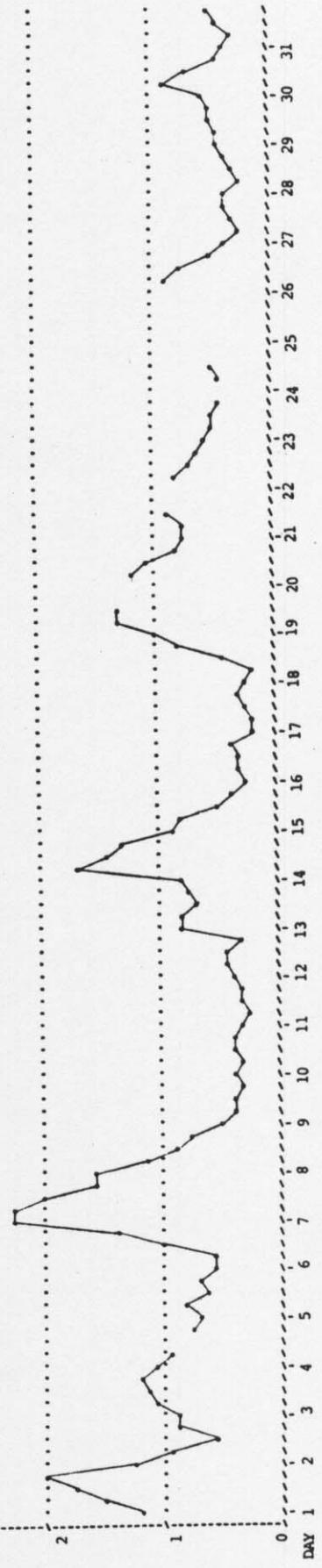
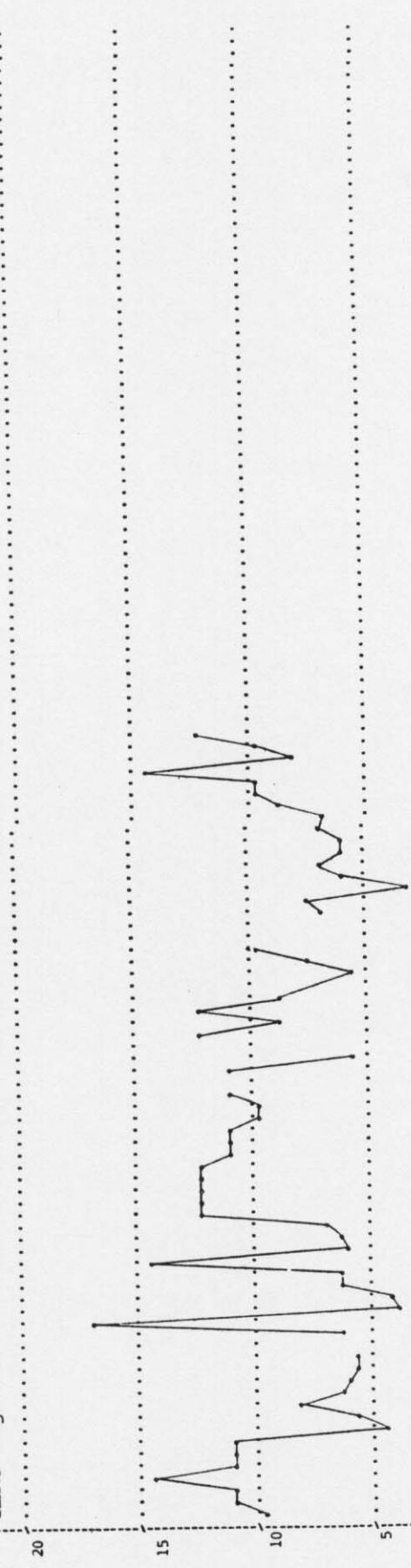


FIGURE 3. Time History of Wave Heights and Periods - December 1985
Part I: Heights

CERC Gage Number 630, Waverider 6 km from shore



Peak Periods (seconds)



CERC Gage Number 625, pier station 19+00

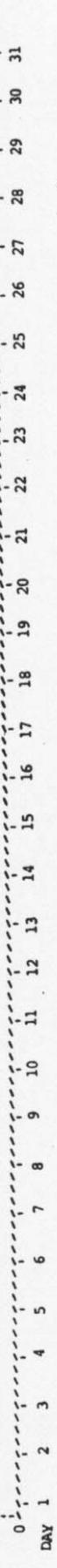
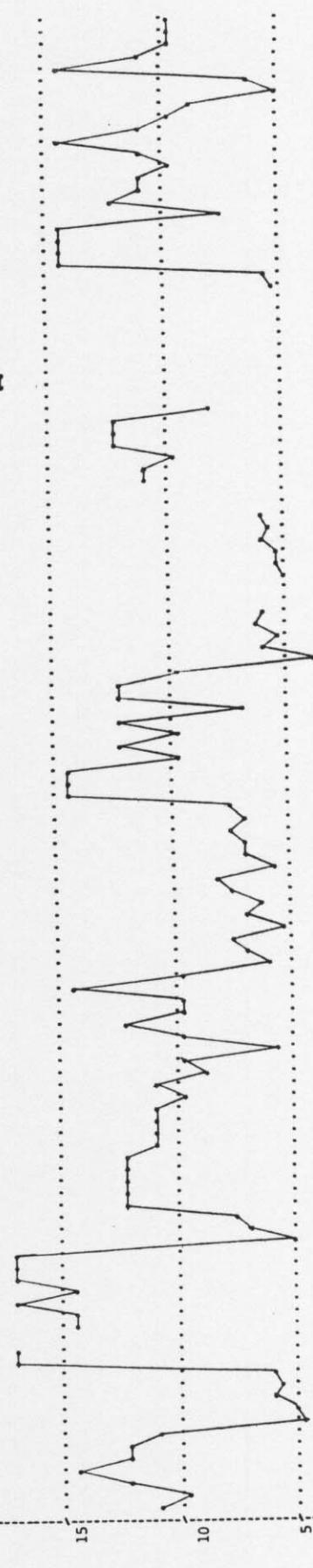


FIGURE 3. Time History of Wave Heights and Periods - December 1985

Part III: Periods

IV. CURRENT DATA

Current data (Table 4) are collected from two Marsh-McBirney electromagnetic biaxial current meters (Table 1 and Figure 2) and by visually observing the movement of dye on the water surface in the surf and at the seaward end of the pier, as well as 500 m updrift of the pier 12 m offshore.

Since the shoreline orientation is approximately N20W, alongshore currents flow either toward 340 (i.e. northward) or toward 160 (i.e. southward). Similarly, cross-shore currents are either onshore (westward) or offshore (eastward).

All current speeds are given in centimeters per second.

TABLE 4: CURRENT DATA
(SPEEDS IN CM/SEC)

December 1985

PIER MEASUREMENTS | BEACH MEASUREMENTS |
| (500 UPDRIFT) |

DAY	TIME	CURRENT METER			DYE AT MID-SURF ZONE			DYE AT SOUTH TRIPOD			
		DYE AT (579m)	AT 14+20(433m) (SURFACE)	I.D.#639 (DEPTH -4.2m MSL)	(SURFACE)	DIST. FROM (SURFACE)	12M OFFSHORE (SURFACE)	DEPTH -4.8m MSL	I.D.#679		
		SPEED	DIR	SPEED	DIR	BASELINE(M)	SPEED	DIR	LOCATION	SPEED	DIR
1	0100-Alongshore	1	9	5							
	Cross-shore			3	ON						
	Resultant			9	176						
1	0700-Alongshore	41	S	13	S		102	S		79	S
	Cross-shore	6	On	4	ON		152	0	0	North	
	Resultant	41	151	14	176			102	160		
1	1300-Alongshore			17	S						
	Cross-shore			5	ON						
	Resultant			18	176						
1	1900-Alongshore			7	S						
	Cross-shore			2	ON						
	Resultant			7	174						
2	0100-Alongshore			3	N						
	Cross-shore			1	ON						
	Resultant			3	328						
2	0700-Alongshore	13	N	11	N		47	N			
	Cross-shore	32	Off	0			119	5	Off	South	
	Resultant	35	222	11	340			47	334		
2	1300-Alongshore			13	N						
	Cross-shore			3	OF						
	Resultant			13	354						
2	1900-Alongshore			5	S						
	Cross-shore			2	OF						
	Resultant			5	139						
3	0100-Alongshore			11	S						
	Cross-shore			4	ON						
	Resultant			11	180						
3	0700-Alongshore	51	S	6	S		122	S			
	Cross-shore	0	0	4	ON		129	67	On	North	
	Resultant	51	160	8	192			139	131		
3	1300-Alongshore			15	S						
	Cross-shore			5	ON						
	Resultant			15	180						
3	1900-Alongshore			10	S						
	Cross-shore			1	ON						
	Resultant			10	168						
4	0100-Alongshore			7	S						
	Cross-shore			2	ON						
	Resultant			8	179						
4	0700-Alongshore	9	S	4	S		55	S			
	Cross-shore	4	On	2	ON		140	3	On	North	
	Resultant	10	133	4	184			56	157		
4	1300-Alongshore			Computer Maintenance							
4	1900-Alongshore			18	S						
	Cross-shore			0							
	Resultant			18	160						
5	0100-Alongshore			15	S						
	Cross-shore			5	ON						
	Resultant			16	177						
5	0700-Alongshore	32	S	10	S		55	S			
	Cross-shore	5	On	1	ON		138	3	On	North	
	Resultant	32	151	10	165			56	157		
5	1300-Alongshore			9	S						
	Cross-shore			1	ON						
	Resultant			9	164						
5	1900-Alongshore			6	S						
	Cross-shore			1	OF						
	Resultant			6	154						
6	0100-Alongshore			8	S						
	Cross-shore			1	OF						
	Resultant			8	152						
6	0700-Alongshore	22	S	5	S		38	S			
	Cross-shore	2	Off	1	OF		140	11	Off	North	
	Resultant	22	166	5	149			40	177		
6	1300-Alongshore			15	S						
	Cross-shore			4	ON						
	Resultant			15	173						
6	1900-Alongshore			19	S						
	Cross-shore			6	ON						
	Resultant			29	177						

GAGE INOPERATIVE

KEY = ALL SPEEDS IN CM/SEC
 N =NORTHWARD, SHORE PARALLEL
 S =SOUTHWARD, SHORE PARALLEL
 ON=ONSHORE
 OF=OFFSHORE

DAY	TIME	PIER MEASUREMENTS			BEACH MEASUREMENTS			CURRENT METER AT SOUTH TRIFOD (DEPTH -4.8m MSL) I.D.#679
		DYE AT	CURRENT METER		DYE AT MID-SURF ZONE	(SURFACE)	DIST. FROM	
		19400	AT 14:20(433m)	(579m)	I.D.#639	(SURFACE)	12M OFFSHORE	
		(SURFACE)	(DEPTH -4.2m MSL)					
		SPEED	DIR	SPEED	DIR	BASELINE(M)	SPEED	DIR
		DIR	DIR	DIR	DIR	LOCATION	SPEED	DIR
7	0100-Alongshore	37	S					
	Cross-shore	9	ON					
	Resultant	38	124					
7	0700-Alongshore	44	S	51	S			
	Cross-shore	13	On	12	ON	176	76	S
	Resultant	45	143	52	123		77	151
7	1300-Alongshore	27	S					
	Cross-shore	5	ON					
	Resultant	27	170					
7	1900-Alongshore	7	S					
	Cross-shore	2	OF					
	Resultant	8	142					
8	0100-Alongshore	3	S					
	Cross-shore	2	ON					
	Resultant	4	193					
8	0700-Alongshore	29	N	2	N		32	N
	Cross-shore	29	Off	4	OF	182	32	Off
	Resultant	41	295	5	47		45	295
8	1300-Alongshore	10	N					
	Cross-shore	6	OF					
	Resultant	12	11					
8	1900-Alongshore	7	N					
	Cross-shore	6	OF					
	Resultant	9	21					
9	0100-Alongshore	8	N					
	Cross-shore	6	OF					
	Resultant	10	13					
9	0700-Alongshore	10	N	9	N		14	N
	Cross-shore	8	Off	6	OF	128	4	Off
	Resultant	13	300	11	12		15	323
9	1300-Alongshore	8	N					
	Cross-shore	5	OF					
	Resultant	10	14					
9	1900-Alongshore	6	N					
	Cross-shore	7	OF					
	Resultant	9	29					
10	0100-Alongshore	0						
	Cross-shore	3	OF					
	Resultant	3	70					
10	0700-Alongshore	5	N	0			9	S
	Cross-shore	1	On	3	OF	114	0	0
	Resultant	5	346	3	70		9	160
10	1300-Alongshore	9	S					
	Cross-shore	0						
	Resultant	10	160					
10	1900-Alongshore	17	S					
	Cross-shore	6	ON					
	Resultant	18	178					
11	0100-Alongshore	1	S					
	Cross-shore	2	OF					
	Resultant	2	95					
11	0700-Alongshore	11	N	1	S		15	N
	Cross-shore	5	Off	4	OF	114	0	0
	Resultant	12	316	4	79		15	340
11	1300-Alongshore	1	N					
	Cross-shore	4	OF					
	Resultant	4	48					
11	1900-Alongshore	1	N					
	Cross-shore	4	OF					
	Resultant	4	61					
12	0100-Alongshore	3	N					
	Cross-shore	4	OF					
	Resultant	5	37					
12	0700-Alongshore	23	N	8	N		27	N
	Cross-shore	7	Off	6	OF	112	3	On
	Resultant	24	323	10	18		27	346
12	1300-Alongshore	1	S					
	Cross-shore	3	OF					
	Resultant	3	83					
12	1900-Alongshore	2	S					
	Cross-shore	2	OF					
	Resultant	1	125					

GAGE INOPERATIVE

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DAY	TIME	PIER MEASUREMENTS			BEACH MEASUREMENTS			CURRENT METER AT SOUTH TRIPOD
		DYE AT 19+00 (579m)	CURRENT METER AT 14+20(433m) I.D.#639	DYE AT MID-SURF ZONE (SURFACE)	DIST. FROM (SURFACE)	I.D. #679		
		SPEED DIR SPEED	DIR BASELINE(M)	SPEED DIR	LOCATION	SPEED DIR	SPEED DIR	SPEED DIR
13	0100-Alongshore	10 S					22 S	
	Cross-shore	3 OF					5 OF	
	Resultant	10 144					23	146
13	0700-Alongshore	0 0 11 S		105 68 S			19 S	
	Cross-shore	31 Off 4 ON		3 Off	North	115 S	6 OF	
	Resultant	31 70 11 178		68 163			20	143
13	1300-Alongshore	6 S					11 S	
	Cross-shore	3 OF					5 OF	
	Resultant	7 130					12 S	137
13	1900-Alongshore	12 S					23 S	
	Cross-shore	0					8 OF	
	Resultant	12 160					24	142
14	0100-Alongshore	13 S					24 S	
	Cross-shore	1 ON					5 OF	
	Resultant	13 163					25	148
14	0700-Alongshore	51 S 24 S		102 S			35 S	
	Cross-shore	10 On 7 ON		41 On	North	74 S	5 OF	
	Resultant	152 149 25 175		109 138			35 152	
14	1300-Alongshore	22 S					34 S	
	Cross-shore	4 ON					7 OF	
	Resultant	23 170					35 149	
14	1900-Alongshore	17 S					29 S	
	Cross-shore	4 ON					5 OF	
	Resultant	17 173					29 150	
15	0100-Alongshore	8 S					17 S	
	Cross-shore	0					7 OF	
	Resultant	8 160					19 139	
15	0700-Alongshore	8 N 2 S		38 S			2 S	
	Cross-shore	5 Off 4 OF		34 Off	North	6 S	6 OF	
	Resultant	9 309 5 90		51 202			7 91	
15	1300-Alongshore	4 N					8 N	
	Cross-shore	6 27					0	
	Resultant	6 34					8 340	
15	1900-Alongshore	4 N					21 N	
	Cross-shore	4 OF					3 ON	
	Resultant	6 24					21 331	
16	0100-Alongshore	7 N					12 N	
	Cross-shore	6 OF					2 ON	
	Resultant	9 19					12 328	
16	0700-Alongshore	9 N 6 N		0 0			1 N	
	Cross-shore	5 Off 5 OF		43 Off	North	6 S	1 ON	
	Resultant	10 311 7 20		43 70			11 332	
16	1300-Alongshore	3 N					6 N	
	Cross-shore	5 OF					1 OF	
	Resultant	6 39					6 350	
16	1900-Alongshore	5 N					12 N	
	Cross-shore	5 OF					1 OF	
	Resultant	6 24					12 343	
17	0100-Alongshore	5 N					11 N	
	Cross-shore	5 OF					0	
	Resultant	8 24					11 340	
17	0700-Alongshore	9 N 6 N		5 S			12 N	
	Cross-shore	6 Off 5 OF		3 Off	North	2 S	0	
	Resultant	10 307 8 22		6 187			12 340	
17	1300-Alongshore	0 3					4 N	
	Cross-shore	3 OF					1 ON	
	Resultant	3 70					4 330	
17	1900-Alongshore	3 N					9 N	
	Cross-shore	5 OF					3 OF	
	Resultant	6 38					9 357	
18	0100-Alongshore	3 N					6 N	
	Cross-shore	5 OF					1 OF	
	Resultant	5 40					6 351	
18	0700-Alongshore	8 N 2 N		0 0			10 N	
	Cross-shore	8 Off 4 OF		43 Off	South	13 S	1 OF	
	Resultant	11 296 5 43		43 70			10 347	
18	1300-Alongshore	5 S					4 S	
	Cross-shore	1 OF					1 OF	
	Resultant	5 146					4 144	
18	1900-Alongshore	13 S					23 S	
	Cross-shore	0					6 OF	
	Resultant	13 160					24 146	

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DAY	TIME	PIER MEASUREMENTS				BEACH MEASUREMENTS (500' UPDRIFT)				DIR
		DYE AT 19+00 (579m) (SURFACE)	CURRENT METER AT 14+20(433m) I.D.#639 (DEPTH -4.2m MSL)	DYE AT MID-SURF ZONE (SURFACE)	DIST. FROM BASELINE(M)	CURRENT METER AT SOUTH TRIPOD (DEPTH -4.8m MSL) I.D.#679	DIR	DIR		
19	0100-Alongshore		20	S				33	S	
	Cross-shore		5	ON				6	OF	
	Resultant		20	174				34	150	
19	0700-Alongshore	47	S	19	S			6	OF	
	Cross-shore	2	Off	3	ON	138	7	On	North	
	Resultant	47	163	19	168		68	154		
19	1300-Alongshore		18	S				31	S	
	Cross-shore		5	ON				6	OF	
	Resultant		19	174				32	149	
19	1900-Alongshore				SYSTEM CRASH					
	Cross-shore									
	Resultant									
20	0100-Alongshore									
	Cross-shore									
	Resultant									
20	0700-Alongshore	29	S	9	S		38	S	23	S
	Cross-shore	0	0	0		141	3	On	6	OF
	Resultant	29	160	9	160		38	154	24	144
20	1300-Alongshore		16	S				34	S	
	Cross-shore		5	ON				4	OF	
	Resultant		17	126				34	152	
20	1900-Alongshore		13	S				26	S	
	Cross-shore		2	ON				7	OF	
	Resultant		13	120				27	145	
21	0100-Alongshore		9	S				19	S	
	Cross-shore		5	ON				5	OF	
	Resultant		11	188				19	146	
21	0700-Alongshore	22	S	15	S		12	S	21	S
	Cross-shore	4	Off	2	ON	152	1	Off	6	OF
	Resultant	22	171	15	167		12	166	22	144
21	1300-Alongshore		13	S				19	S	
	Cross-shore		3	ON				7	OF	
	Resultant		13	172				20	140	
21	1900-Alongshore				SYSTEM CRASH					
	Cross-shore									
	Resultant									
22	0100-Alongshore									
	Cross-shore									
	Resultant									
22	0700-Alongshore	12	S	3	S		36	S	3	S
	Cross-shore	2	Off	1	OF	152	5	On	5	OF
	Resultant	12	171	4	137		36	151	6	106
22	1300-Alongshore		1	N					5	N
	Cross-shore		1	OF					2	ON
	Resultant		1	32					6	321
22	1900-Alongshore		2	N					11	N
	Cross-shore		3	OF					1	ON
	Resultant		4	31					11	335
23	0100-Alongshore		7	N					17	N
	Cross-shore		4	OF					4	ON
	Resultant		8	7					12	328
23	0700-Alongshore	16	N	4	N		20	N	11	N
	Cross-shore	16	Off	3	OF	140	7	Off	3	ON
	Resultant	23	295	5	21		22	321	12	324
23	1300-Alongshore		6	N					11	ON
	Cross-shore		4	OF					1	OF
	Resultant		7	16					11	332
23	1900-Alongshore		2	N					6	N
	Cross-shore		4	OF					1	OF
	Resultant		4	43					6	353
24	0100-Alongshore		4	N					8	N
	Cross-shore		4	OF					1	OF
	Resultant		6	28					8	351
24	0700-Alongshore	10	N	2	N				6	N
	Cross-shore	4	On	3	OF	128	1	Off	3	OF
	Resultant	11	2	4	38		27	337	7	5
24	1300-Alongshore		1	N					6	ON
	Cross-shore		2	OF					2	ON
	Resultant		2	43					6	323
24	1900-Alongshore									
	Cross-shore									
	Resultant									

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PIER MEASUREMENTS										BEACH MEASUREMENTS (500 UPDRIFT)					
		DYE AT : CURRENT METER :		19+00 : AT 14+20(433m) : DYE AT MID-SURF ZONE		(579m) : I.D.#639 : (SURFACE)		(SURFACE) : (DEPTH -4.2m MSL) : DIST. FROM		DYE : AT SOUTH TRIFOD		12M OFFSHORE : (DEPTH -4.8m MSL)		I.D.#679	
DAY	TIME	SPEED	DIR	SPEED	DIR	BASELINE(M)	SPEED	DIR	LOCATION	SPEED	DIR	SPEED	DIR	SPEED	DIR
25	0100-Alongshore														
	Cross-shore														
	Resultant														
25	0700-Alongshore	32	S	3	On	DISK CRASH	134	38	S	North	63	S			
	Cross-shore							0	0						
	Resultant	32		154			38	160							
25	1300-Alongshore														
	Cross-shore														
	Resultant														
25	1900-Alongshore														
	Cross-shore														
	Resultant														
26	0100-Alongshore														
	Cross-shore														
	Resultant														
26	0700-Alongshore	27	S	10	S	ON	176	34	S	North	34	S	23	S	OF
	Cross-shore	13	Off	1				3	On				3		153
	Resultant	30	187	10	165		34	154					16	S	
26	1300-Alongshore			6	S								3		OF
	Cross-shore			1	OF								17	150	
	Resultant			6	154								3	N	
26	1900-Alongshore			3	N								4	OF	
	Cross-shore			5	OF								5	34	
	Resultant			6	38								20	N	
27	0100-Alongshore			6	N								1	OF	
	Cross-shore			5	OF								20	344	
	Resultant			8	23								17	N	
27	0700-Alongshore	22	N	8	N								2	OF	
	Cross-shore	22	Off	6	OF		122	32	0	0	South	12	N	17	345
	Resultant	31	295	10	19			32	70				11	N	
27	1300-Alongshore			4	N								3	OF	
	Cross-shore			6	OF								12	353	
	Resultant			7	34								14	N	
27	1900-Alongshore			7	N								1	OF	
	Cross-shore			7	OF								14	344	
	Resultant			10	23								13	N	
28	0100-Alongshore			7	N								3	OF	
	Cross-shore			6	OF								14	353	
	Resultant			10	22								2	OF	
28	0700-Alongshore	11	N	3	N								11	N	352
	Cross-shore	2	On	5	OF		128	15	0	0	South	4	N	5	N
	Resultant	11	351	6	43			15	270				1	OF	
28	1300-Alongshore			1	N								5	351	
	Cross-shore			4	OF								5	N	
	Resultant			4	51								10	3	OF
28	1900-Alongshore			4	N								3	356	
	Cross-shore			5	OF								10		
	Resultant			7	30								3	N	
29	0100-Alongshore			3	N								3	OF	
	Cross-shore			5	OF								4	24	
	Resultant			5	41								8	N	
29	0700-Alongshore	0	0	6	N			106	29	N			22	N	5
	Cross-shore	0	0	6	OF			29	340				2	OF	
	Resultant			9	25								5	N	
29	1300-Alongshore			2	N								2	OF	
	Cross-shore			5	OF								5	3	
	Resultant			5	59								6	N	
29	1900-Alongshore			2	N								3	OF	
	Cross-shore			4	OF								7	12	
	Resultant			4	37								12	S	
30	0100-Alongshore			6	S								4	OF	
	Cross-shore			1	OF								13	141	
	Resultant			6	151								8	S	
30	0700-Alongshore	13	S	1	S								9	135	
	Cross-shore	6	Off	3	OF		125	44	S				40	S	
	Resultant	14	187	3	98			44	160				5	OF	
30	1300-Alongshore			21	S								40	153	
	Cross-shore			3	ON								5		
	Resultant			22	169								40		
30	1900-Alongshore			2	S								7	S	
	Cross-shore			1	ON								1	OF	
	Resultant			2	189								7	152	
31	0100-Alongshore			2	S								17	S	
	Cross-shore			1	ON								3	OF	
	Resultant			2	198								17	150	
31	0700-Alongshore	18	S	1	N								7	N	
	Cross-shore	14	Off	4	OF		109	51	N				0		
	Resultant	23	197	4	51			72	295				7	340	
31	1300-Alongshore			2	N								10		
	Cross-shore			4	OF								3	ON	
	Resultant			5	40								10	325	
31	1900-Alongshore			8	N								19	N	
	Cross-shore			7	OF								2	OF	
	Resultant			11	18								19	345	

KEY = ALL SPEEDS IN CM/SEC
 N =NORTHWARD, SHORE PARALLEL
 S =SOUTHWARD, SHORE PARALLEL
 ON=ONSHORE
 OF=OFFSHORE

V. SUPPLEMENTAL OBSERVATIONS

Visual wave direction measurements (Table 5) taken at the seaward end of the pier are made of both the primary wave train (i.e. that having the larger wave heights) and the secondary wave train (which must be clearly distinguishable as a wave train separate from the primary waves) but not surface chop or capillary waves. The direction of the primary wave train just north of the seaward end of the pier is also determined using a Raytheon Marine Pathfinder radar and measuring alignment of the wave crests. The pier axis (considered perpendicular to the beach at the FRF) is orientated 70° east of true north; consequently, wave angles greater than 70° imply the waves were coming from the south side of the pier.

The width of the surf zone (seawardmost breaker position to shoreline) is determined from the pier deck.

Measurements of surface water temperature, density, and visibility are made daily at the seaward end of the FRF pier. A jar along with a thermometer is lowered about .3 m (1 ft) into the water and allowed to remain for at least one minute. The jar is removed, the temperature read and a hydrometer is used to determine the density. A secci disc is used to determine the surface visibility.

SUPPLEMENTAL OBSERVATIONS

December 1985

DAY	TIME	WAVE APPROACH ANGLE AT PIER END (° from True N)		RADAR WAVE ANGLE (° from True N)	WIDTH OF SURF ZONE(M)	WATER CHARACTERISTICS AT PIER END		
		PRIMARY	SECONDARY			TEMP (°C)	DENSITY (g/cc)	SECCI VIS(M)
1	0950	60		70	137	15.9	1.0202	.9
2	0815			.	26	16.4	1.0217	.6
3	0810			45	46	14.5	1.0234	.6
4	0805	35		70	62	14.5	1.0229	2.7
5	0800	50	70	70	59	12.2	1.0202	1.5
6	0800	45			47	12.3	1.0199	2.1
7	0830	55	30		234	10.5	1.0196	.6
8	0920	90			231	12.3	1.0217	.9
9	0745	85	5		29	13.2	1.0235	1.2
10	0740	10	345		3	12.8	1.0231	1.8
11	0755				3	11.9	1.0219	1.5
12	0745	120			2	14.0	1.0243	2.1
13	0740	20	110		9	14.0	1.0240	.6
14	0925	40		30	116	13.5	1.0238	.9
15	0925	10			12	11.0	1.0224	1.8
16	0720				3	11.8	1.0236	1.5
17	0710				2	11.7	1.0243	1.5
18	0735				1	11.5	1.0242	2.4
19	0800	45		50	61	9.7	1.0240	.6
20	0810	45			52	8.6	1.0241	.6
21	0805	55	40		64	8.2	1.0220	1.2
22	0900	40			68	8.2	1.0226	.6
23	0830	80			52	10.2	1.0242	.9
24	0840	80	130		43	10.6	1.0246	1.2
25	0930	20			73	11.0	1.0238	.6
26	1000	50			128	8.5	1.0244	.9
27	0830				18	8.0	1.0254	.9
28	0925	100			9	8.5	1.0246	1.8
29	0920	105			9	9.0	1.0246	2.1
30	0835	40			67	8.1	1.0248	1.2
31	0815	90	140		9	8.2	1.0242	1.5

VI. WATER LEVELS

The National Ocean Services (NOS) has established a primary tide station (No. 865- 1370) at the seaward end of the FRF pier. A Leupold-Stevens digital recording float-type tide gage is used to collect data every 6 minutes throughout the month.

Figure 4 shows the range of each cycle while Figure 5 shows the variation in mean water levels computed over a tidal cycle period (12.42 hours), and contains a list of selected mean and extreme values. This presentation is useful in identifying effects on both meteorological and astronomical forces on the open coast water levels.

Table 6 contains the time of the center of each sampling interval and the range, high, low, and mean water levels during each tidal cycle.

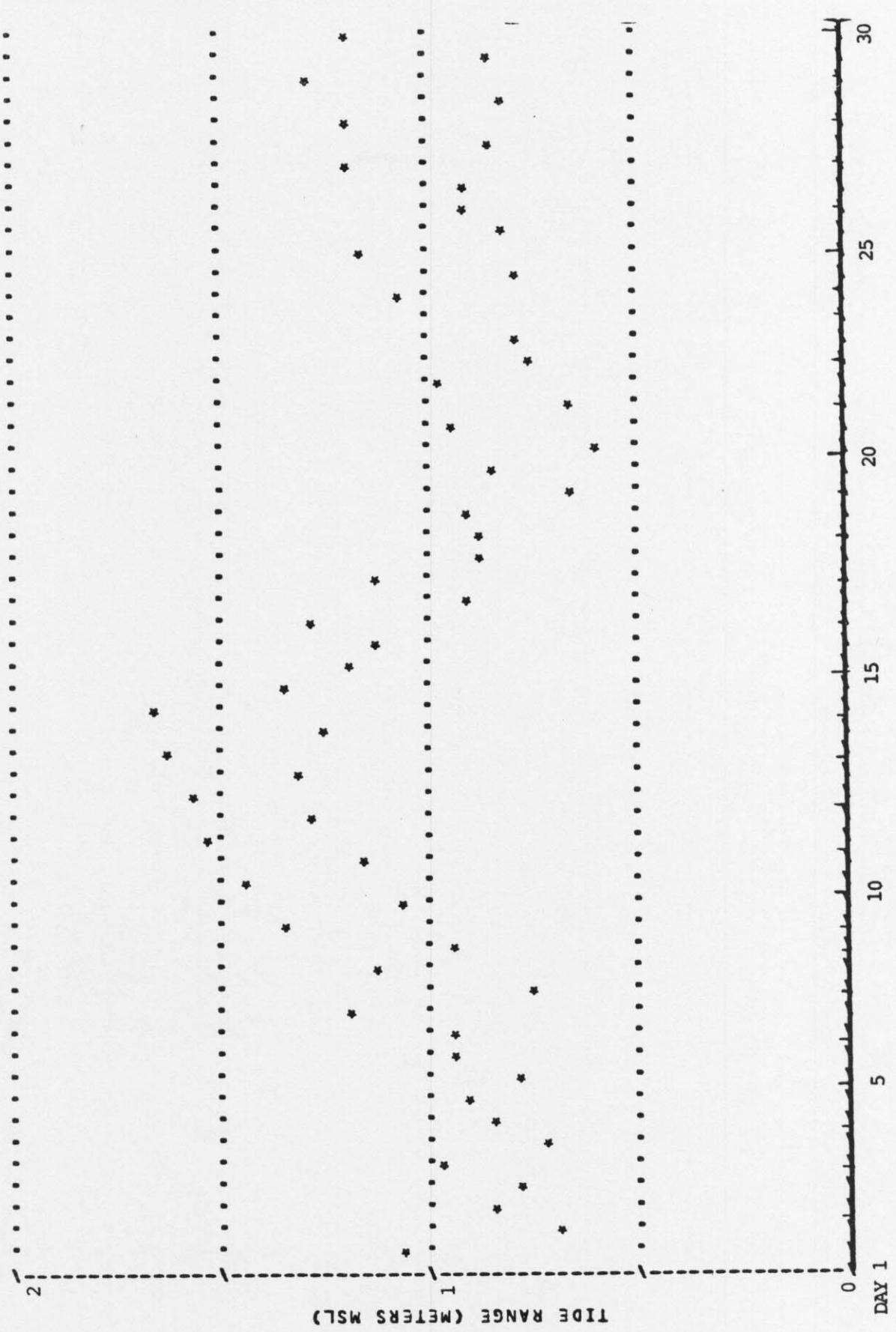


FIGURE 4. Time History of Tide Range, December 1985 (Gage No. 865-1370)

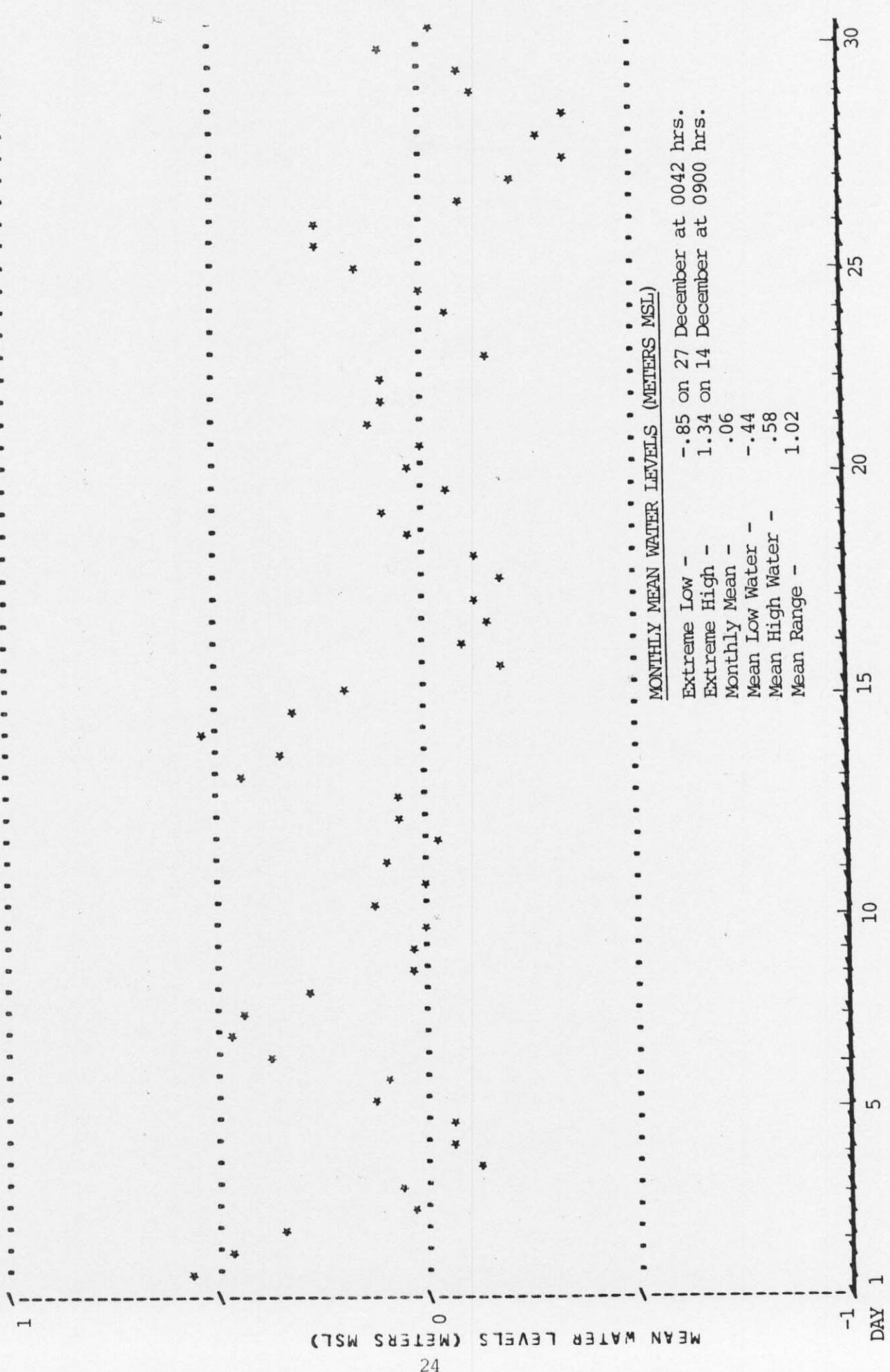


FIGURE 5. Time History of Mean Water Levels, December 1985 (Gage No. 865-1370)

TABLE 6
WATER LEVELS (METERS MSL)
 Tidal Characteristics
 December 1985

	MID-CYCLE DAY	LOW	HIGH	MEAN	RANGE
	TIME				
1	612	.05	1.12	.57	1.07
1	1837	.11	.80	.47	.69
2	702	-.03	.82	.36	.85
2	1928	-.43	.36	.02	.79
3	753	-.41	.57	.08	.98
3	2018	-.48	.23	-.13	.72
4	843	-.50	.35	-.08	.85
4	2108	-.52	.38	-.06	.90
5	934	-.30	.49	.12	.79
5	2159	-.37	.58	.10	.94
6	1024	-.09	.86	.37	.94
6	2249	-.10	1.03	.48	1.18
7	1114	-.05	.81	.45	.76
7	2340	-.29	.82	.27	1.11
8	1205	-.43	.52	.03	.94
9	30	-.62	.73	.04	1.35
9	1255	-.56	.49	-.01	1.05
10	120	-.58	.87	.12	1.45
10	1346	-.59	.57	.01	1.16
11	211	-.64	.90	.10	1.55
11	1436	-.68	.61	-.04	1.29
12	301	-.69	.87	.05	1.57
12	1526	-.65	.67	.07	1.32
13	352	-.32	1.30	.45	1.63
13	1617	-.31	.94	.33	1.25
14	442	-.31	1.34	.53	1.65
14	1707	-.26	1.08	.32	1.34
15	532	-.40	.80	.18	1.20
15	1758	-.69	.45	-.20	1.14
16	623	-.69	.59	-.10	1.28
16	1848	-.60	.30	-.16	.90
17	713	-.66	.47	-.12	1.13
17	1938	-.60	.26	-.17	.86
18	804	-.55	.34	-.14	.89
18	2029	-.40	.51	.04	.91
19	854	-.27	.39	.08	.66
19	2119	-.48	.35	-.07	.84
20	944	-.28	.32	.02	.60
20	2210	-.47	.45	-.01	.92
21	1035	-.20	.46	.12	.66
21	2300	-.32	.63	.11	.96
22	1125	-.22	.52	.09	.74
22	2350	-.53	.24	-.15	.78
23	1216				
24	41	-.57	.50	-.08	1.07
24	1306	-.40	.39	-.01	.79
25	131	-.39	.76	.14	1.15
25	1356	-.18	.63	.26	.81
26	222	-.21	.69	.24	.89
26	1447	-.51	.40	-.09	.91
27	312	-.85	.35	-.23	1.20
27	1537	-.80	.05	-.34	.84
28	402	-.85	.35	-.28	1.20
28	1628	-.78	.04	-.33	.82
29	453	-.74	.53	-.12	1.27
29	1718	-.56	.28	-.11	.84
30	543	-.47	.71	.11	1.17
30	1808	-.45	.33	-.03	.78
31	634	-.52	.48	-.04	1.00

VII. NEARSHORE PROFILES

A. Nearshore Profiles. In order to document profile response away from the pier, surveys of four profile lines extending 900 to 1,000 m from shore and located 489 and 581 m north and 517 and 608 m south of the FRF pier are conducted bi-weekly, after storms, and during more complete bathymetric surveys.

These profiles are obtained using the CRAB-Zeiss surveying system; a Zeiss Elta-2 first-order, self-recording electronic theodolite distance meter in combination with the Coastal Research Amphibious Buggy (CRAB), a 10.7 m high, self-powered, mobile tripod on wheels.

Figure 6 shows the last survey in November and the three surveys taken during December on profile line 188, located 517 m south of the pier. The December surveys show minor changes occurring on the profile with a small amount of erosion visible on the foreshore (80 to 130 m). The nearshore bar (200 m) remained stationary; however, the outer bar (280 to 400 m) migrated 30 m shoreward.

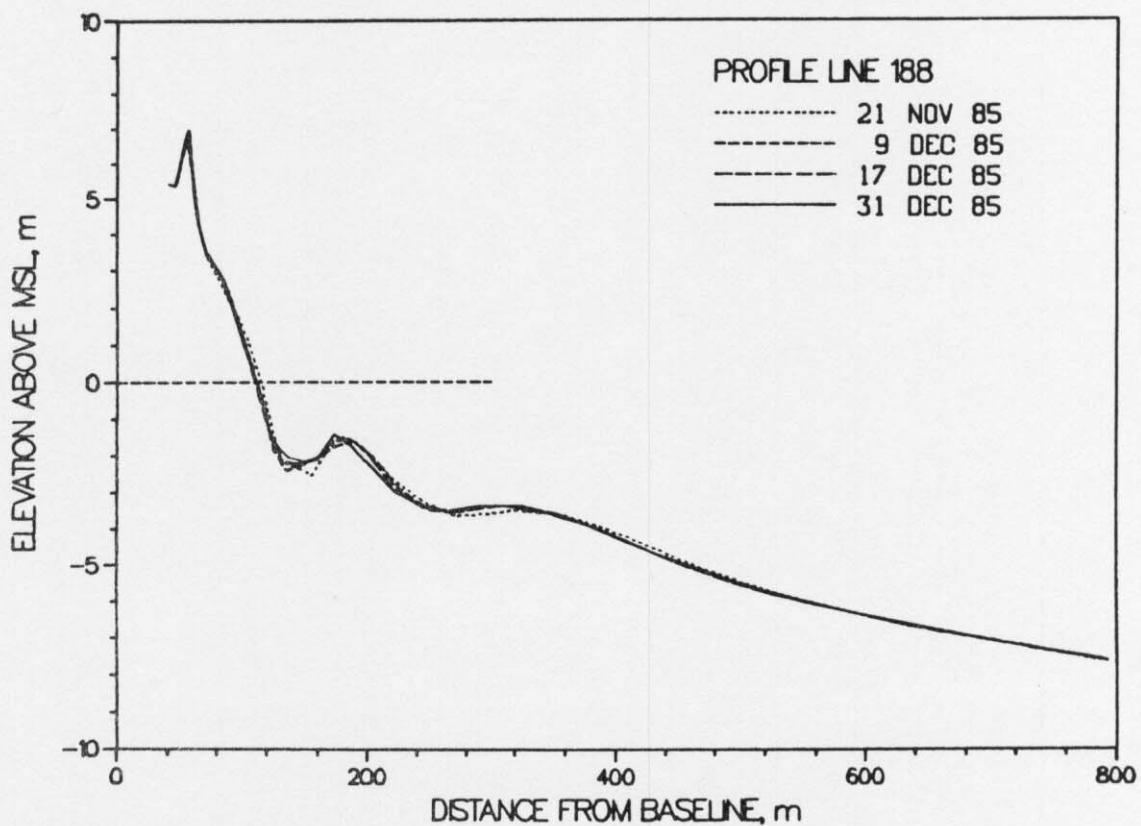


Figure 6. Monthly CRAB profiles on profile 188 - 517 meters south of pier.

The profile envelope (Figure 7) reflects the maximum changes which occurred on the profile between January and December. No significant changes occurred.

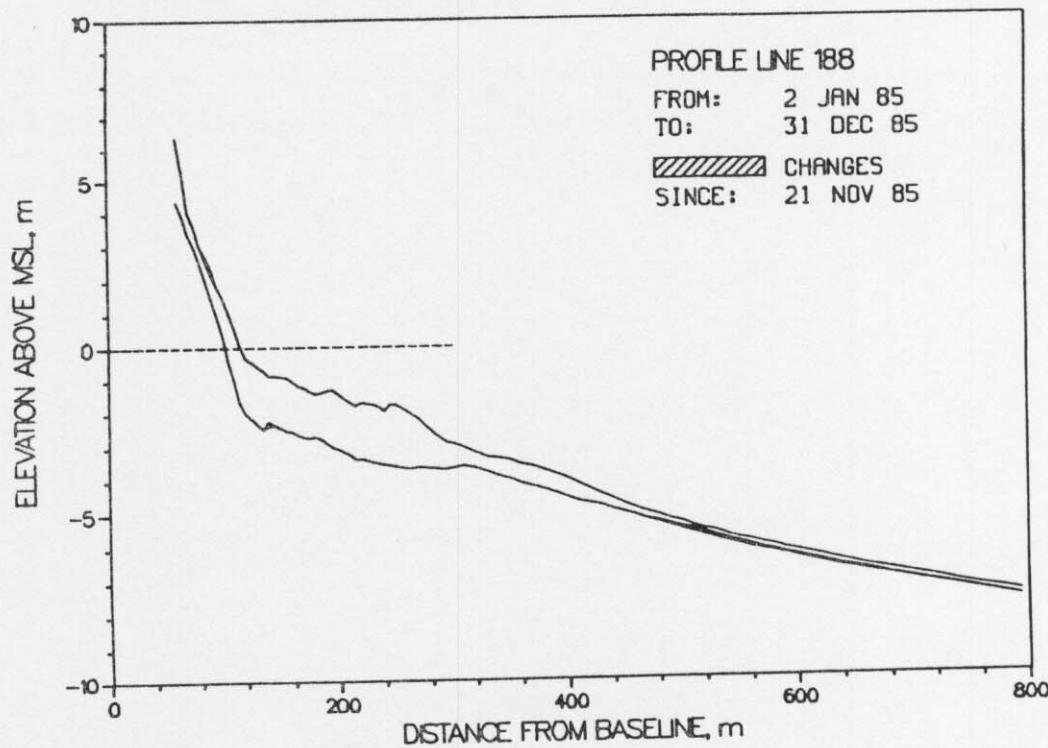


Figure 7. CRAB profile envelope - profile 188.

B. Bathymetry. This month's bathymetric survey, Figure 8, was completed on 19 December (two months after the last survey on 28 September), and significant changes had occurred. The September survey, which immediately followed the passage of Hurricane Gloria, revealed both a general offshore migration of the inner bar and unusual erosion just north of and parallel to the pier. The December survey shows that this area of erosion (from 250 m to the end of the pier) had filled in with up to 1 m of accretion. The inner bar continued to move offshore north of the pier but was stable south of the pier. The beach also accreted north of the pier. Offshore contours deeper than -4 m became more shore parallel except north of the pier (-3 to -6 m) where there is evidence of a minor shoal. The trough under the pier also returned to a more symmetrical shape.

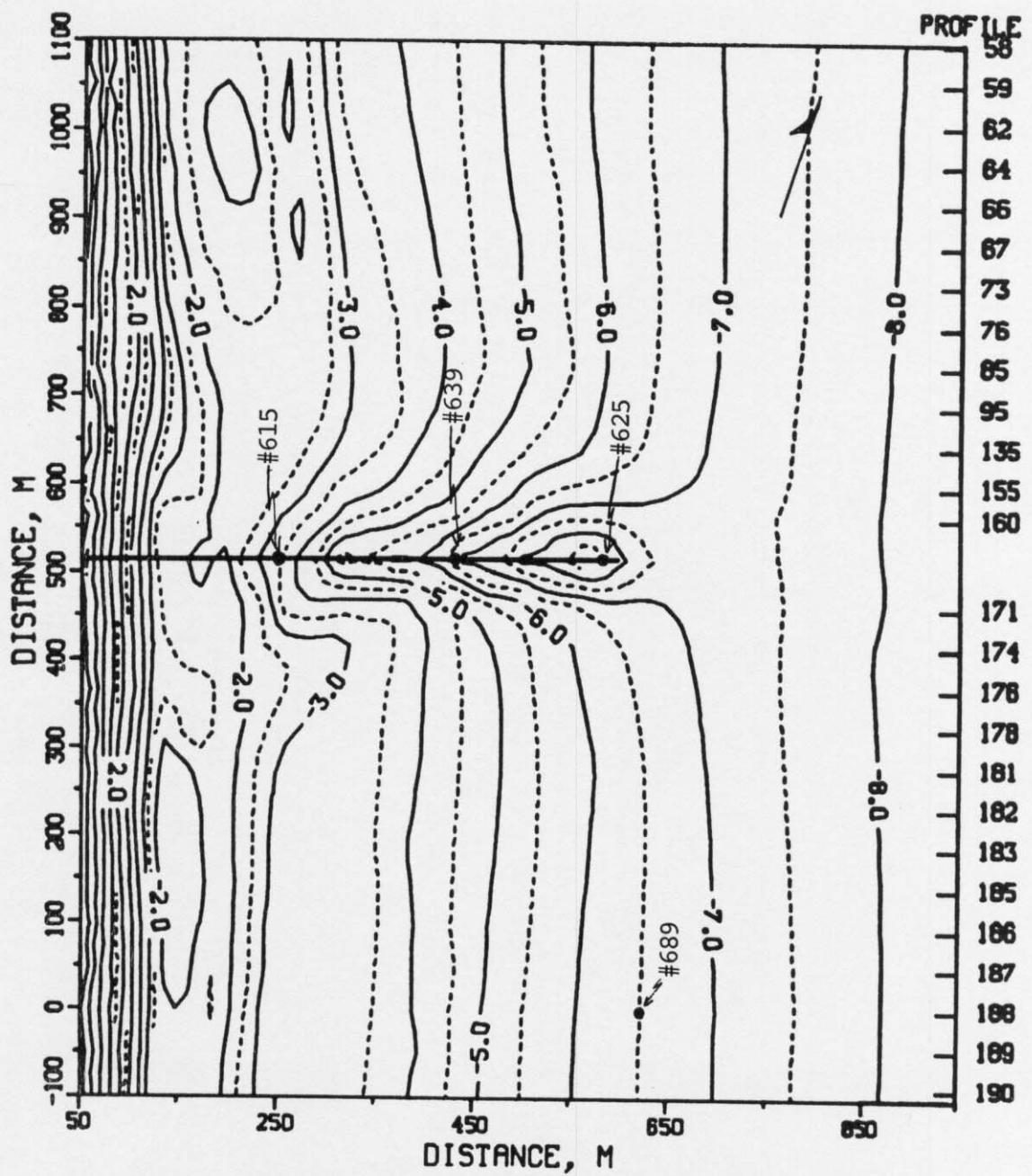


FIGURE 8. FRF BATHYMETRY 19 DEC 85
CONTOURS IN METERS

VIII. SPECIAL EVENTS

A. Storm Data Collection. The following list identifies times when the wave height at the seaward end of the pier (i.e. as measured by the Baylor gage #625 at pier station 19+00) exceeded 2 m and wave records were obtained every hour:

<u>Start</u>	<u>End</u>
1 Dec (1500)	1 Dec (1900)
7 Dec (0000)	7 Dec (1300)

B. Storm Synopsis.

1. 1-2 December: A weak low pressure system developed in Georgia on 30 November and quickly moved past the FRF on 1 December. Winds peaked at only 4 m/s (northeast) for several hours with the maximum Hmo (gage #625) of 2.31 m measured at 1800 hrs on 1 December. There was no precipitation at the FRF.

2. 6-7 December: Forming on a stationary front over Florida early on 6 December, this storm rapidly moved northeast into the Atlantic well off the North Carolina coast on the morning of the same day. Maximum winds out of the northeast exceeded 14 m/s with Hmo (gage #625) reaching 2.43 m at 0800 hrs on 7 December. The minimum barometric pressure was 1012.8 mb at 1300 hrs on 6 December. There was no precipitation.

Distribution List

Government Agencies:

OCE	U.S. Geological Survey
BERH	U.S. National Park Service
NAO	U.S. Naval Academy
NASA/Wallops Flight Center	U.S. Naval Civil Eng. Lab
NOAA (NOS, NWS)	U.S. Naval Facilities Eng. Com.
SAD	
SAW	U.S. Naval Research Lab

Colleges/Universities:

California Inst. of Tech.	Stockton State College
Duke University	Texas A&M University
East Carolina University	University of Akron
Florida Inst. of Tech.	University of Delaware
NC State University	University of Florida
Old Dominion University	University of Maryland
Oregon State University	University of Miami
Prince George's College	University of North Carolina
Rutgers University	University of Northern Colorado
Scripps Inst. of Oceanography	University of Rhode Island
Southern Illinois University	University of Virginia
	Virginia Inst. of Marine Science

Others:

City of Va. Beach, VA	Moffatt & Nichol, Eng.
Coastal Barge Corporation	Offshore Coastal Technologies
Coastal and Est. Res., Inc.	Mr. Rowland
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Ministry of Construction, Coastal Division (Japan)
Norwegian Hydrodynamic Laboratories (Norway)
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University of Sydney (Australia)